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TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-7367

TAT-02-F-04455 MEMORANDUM

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Response and Prevention Branch, U.S. EPA

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SUBJECT: Tutu Wells Data and Other Projections
TDD #02-8802-10

DATE: February 12, 1988

BACKGROUND:

The Tutu well site has been sampled repeatedly over the last six months and found to contain definite contamination. The initial assessment was conducted in July through September of 1987. Subsequent sampling and analysis has proceeded on a monthly basis. The initial assessment considered over one hundred wells and cisterns. Subsequent monitoring has concentrated on the wells that showed some type of contamination.

ANALYTICAL RESULTS:

The data collected over the monitoring period has been summarized and reduced to reflect the actual contamination. Table #1 lists the wells included in the current sampling program. Tables #2 and #3 illustrate the volatile organic analyses of the contaminated wells and give the highest amount of organic contamination found consistently during the last six months. Table #4 shows the most significant metals and cyanide concentrations reported.

OBSERVATIONS:

It is noteworthy that the major contaminants have been confirmed by various independent laboratories and that the same chemicals appear consistently throughout the monitoring

period. The list of chemicals found repeatedly in significant concentrations include the following:

DCE	1,2-trans-dichloroethylene
TCE	Trichloroethylene
PCE	Tetrachloroethylene
TOL	Toluene
BEN	Benzene

Initial confirmation efforts identified high concentrations (>1,000 ppb) of unknown alkanes and alkenes and traces of several known solvents. In addition, the samples collected in October 1987 showed significant concentrations of tertbutyl methyl ether (TBME) and several inorganics.

The concentrations of these contaminants fluctuate from one month to the next. Various factors appear to affect the results. Every effort has been made to limit the variables involved from sample collection to analytical results. However, the sampling process depends on a pump delivery. Consequently, aeration and degassing are real possibilities and will affect the samples. In addition, the condition of the well's casing and leachates from the area contiguous to the well intake may increase the contaminants in the samples.

The most recent analyses did show metals and cyanide. The lab report showed eight distinct metals. Zinc was found in most of the wells. The concentrations detected exceeded the National Secondary Drinking Water Standards. Arsenic and selenium were also found above the Primary Drinking Water Regulations. The reported concentration for cyanide and other metals was below the available published standards.

In summary, the Tutu wells site monitoring has indicated persistent contamination. Several wells have various specific organic and inorganic contaminants in concentrations that exceed available drinking water standards. The volatile organics detected fall into two categories. The benzene, toluene, xylenes, tert-butyl methyl ether, and other alkanes or alkenes correspond to the typical petroleum hydrocarbons found in gasoline. The chlorinated hydrocarbons fall into the class of industrial solvents and typical degreasers or cleaning agents. These may be the product of leaking underground storage tanks or discharges from any of the industries or businesses in the area.

The source of the inorganic found and the metals detected is more difficult to identify, but must be considered equally foreign to the wells in the concentrations reported. The inorganics and metals are usually the result of some type of

industrial runoff. At Tutu, this contamination may even include contributions from the pipes pumps and hardware used at the wells.

PROJECTIONS:

The Tutu wells sampling and analysis has provided a sound basis for future work in the area. The contaminants found fall under the Target Compounds List (TCL) and the Target Analyte List (TAL). The former includes the most common hazardous organic chemicals and the latter covers the metals. Any future work in the Virgin Islands should address these lists to ensure adequate analysis of the potential contamination.

Adequate assessment should progress from preliminary screening by Photovac, to establish the wells suspected to be contaminated, to confirmation and identification of other organic and inorganic contaminants by standard EPA procedures.

Tutu had mainly Volatile Organic (VO) materials and metals. Other areas in the Virgin Islands may show additional contamination. It all depends on the industrial, agricultural and domestic demands present. The best way to cover all the angles is to run the full TCL-TAL (see Table #5 and #6). This is the only way to properly document the quality of the water at the pump outlet whenever, multiple sources of potential contamination are suspected.

Table 1 Current Well Monitoring Program at Tutu Well Site

1	Dede
2	Steele
3	Eglin #1
4	Eglin #2
5	Eglin #3
6	4 Winds
7	Smith
8	Bryan
9	Harvey
10	Tillet
11	Harthman Estate
12	Harthman Bakery
13	Harthman Crusher
14	Devcon #1
15	Devcon #3
16	VIHA #1
17	VIHA #3
18	Dench
19	Ramsey
20	Alpha Leonard
21	Francois
22	Demitris
23	Rodriguez Auto
24	Mathias

Table 2 Highest Amount of Contamination Detected on Photovac from September 1987 to January 1988

WELL	Contaminant (ppb)				
	BEN	TOL	PCE	TCE	DCE
H. Crusher	5	3.5	29.5	7	4
Ramsey	4.5	3.5	>50	1	2.7
Leonard	ND	31	<1	ND	ND
Francois	ND	1.2	275	37.8	6.8
Mathias	<1	23	100	55	<1
Steele	<1	3	575	100	<5
4 Winds	1	2	450	100	13
Eglin	2	6	105	30.5	7.5
Smith	<1	2	>500	70	<5
Harvey	ND	ND	>1000	90	14
Tillet	>1000	180	>500	200	45

Table 3 Highest Amount of Contamination Confirmed by GC/MS from September 1987 to January 1988

Well	Contaminant (ppb)[3]					
	BEN	TOL	PCE	TCE	DCE	TBME[1]
H.Crusher	ND	6	9	7	20	
Ramsey	ND	ND	c22	1.7	6.3	
Leonard	ND	22	0.1	ND	ND	
Francois	ND	ND	130	40	220	180
Mathias	ND	ND	59	4	22	
Steele	ND	ND	320	15	110	37
8 Winds	7	6	140	19	280	470
Eglin	3	6	100	17	78	390
Smith	ND	ND	150	21	100	34
Harvey[2]	ND	ND	2000	23	49	
Tillet[4]	6950	452	2040	711	2600	470
Tillet[5]	633	48	200	65	35	

[1]From 10/87 HSL ±40 report

[2]Showed 120,000 ppb methylene chloride; sample after PVC repair

[3]Found at >1000 ppb unknown alkanes and alkenes

[4]Tillet pumped

[5]Tillet before pumping

TABLE 4
METALS AND CYANIDE CONCENTRATION
AT TUTU WELLS SITE DURING
OCTOBER 1987 SAMPLING

Contamination (mg/l)

Well	Cyanide	Antimony	Arsenic	Chromium	Copper	Selenium	Thallium	Zinc
Field Blank	0.016M							10M
Bryan								30M
Tillet	0.015M			8M	10M			10M
Four Winds				6M	5M			51*
Elgin #3				6M	5M		3M	98*
Elgin #2					8M			200*
Elgin #1	0.058				5M			82*
Francois	0.018			9M				108*
VI Housing #1	0.023				10M	13*		30M
VI Housing #3	0.019				22M	3M		30M
Hartman Estate						4M		20M
Demitri					20J	3M		40J
Rodriguez					5M			30M
Ramsey	0.018	2M						10M
Steele		3M		20M	20M	15*		20M
Harvey				10M	8M			340*
Mathias						5.6*		10M
Smith					7M	3M		460*
Devcon #1								10M
Devcon #3				10M		7.1*		20M
A. Leonard			15*			8.5		10M
H. Crusher					10M			10M
Dede								30M
Dench		4M			10M		12*	68*
H. Bakery		1M						20M

M = Detected but not quantified J = Estimated * = Significant values